The
Ballarat
Naturalist

September
~~August~~ 2002

Lichens

Speaker: Dr. Kathleen Ralston

Lichens are rarely noticed and most people have limited or no knowledge of them. They can be classified into three types and each type has distinguishing features which once known make for easier identification in the field.

Crustose (crust) lichens form flat crusty plates. They grow very slowly outwards around the margin, increasing their radius by as little as 0.5 mm a year.

Foliose (leafy) lichens are leafy in appearance, although lobed or branched structures are not true leaves. They often grow near mosses.

Fruticose (shrubby) are even more finely branched and may hang down like beards from branches or grow up from the ground like tiny shrubs.

These last two are particularly fussy about clean air but grow faster than crustose lichens.

It is commonly believed that lichens are brownish in colour but actually come in different colours. Another misconception about lichens is that they kill trees but in fact they take their nutrients from the air. In order to survive they require clean air and light.

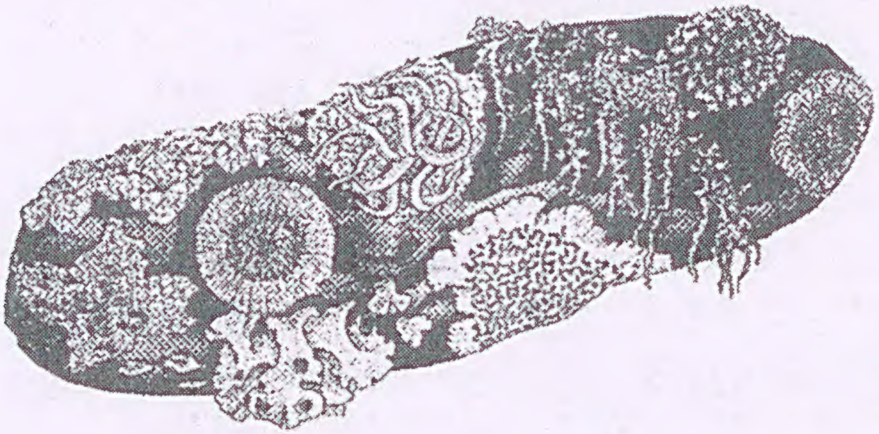
There are thought to be 20,000 lichens in the world and of these 2,000 to 3,000 have been identified and 1,000 of these identified lichens are endemic to Australia. Ferdinand Von Mueller collected and identified many lichens in Australia.

Lichens are made up of two organisms. They were previously regarded as individual plants but are actually made up of two organisms which are intertwined. The two components are fungus and an alga which form a single thallus. The fungus draws up water and minerals that the alga can use, while the alga uses its chlorophyll to manufacture food.

The structure of lichens can be demonstrated by taking a cross section and magnifying it. This shows the cortex top which is fungi, underneath is algae, then a layer of fungi . The algae is protected by the fungi layers. Many lichens produce small powdery granules called **soredia** on their surface. These contain both algal cells and fungal threads. When washed or blown away, or carried by insects, they grow into new lichens. Sometimes the fungal partners make their own fruiting bodies. Fruiting bodies vary in appearance, some resembling small volcanoes, cups or jam tarts. When these burst, the fungal spores are dispersed but if they do not pair up with the correct algal cells they cannot develop.

Lichens can occur in a variety of habitats and can withstand extreme heat or cold. They are found on stable surfaces such as rocks, walls, trees, fences, roofs and on the ground as well as on leaves. Lichens are not found in areas where polluted air is present and so these plants are a good indicator of a clean environment. Australia has numerous lichens which suggest that most of our air is pollution free.

Dr. Ralston concluded her talk by showing slides of lichens in a variety of Australian habitats. These were magnified and demonstrated the appearance of the three types of lichen.



Kay Preston

Lichens in the Field

Leader: Dr. Kathleen Ralston

Some dozen souls braved the wintry day to educate themselves in the recognition of lichens in the field. Dr. Kathleen Ralston was our instructor.

We assembled at St. George's Lake in the Creswick Regional Park and walked to the study area at the eastern end of the Lake. En route we viewed a colony of Nodding Greenhoods *Pterostylis nutans* just beginning to flower and growing amongst the shale debris of a mullock heap.

Once across the Creswick Creek, the lichen foray began in earnest. Not that it was difficult to find a great diversity of the plant associations - firstly on exotic trees, then on the roadside banks, on rocks and on the earth surface itself.

The morphological classification given to us at the lecture, crustose, foliose and fruticose, quickly was inadequate. The names began to be familiar but disappointment came as hand lenses were insufficient for the diagnosis of several specimens; laboratory facilities were needed.

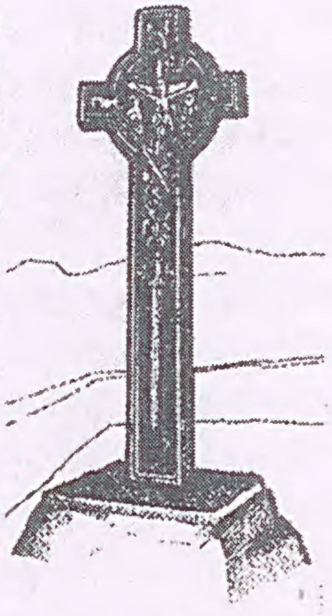
The tenacity of a crustose lichen on the surface of the soil was demonstrated. The importance of lichens in soil stabilisation was explained.

We studied plant succession on a number of rocks seeing the vegetative development from crustose lichen, through foliose and/or fruticose to mosses and higher plants.

We left the road and climbed through regrowth eucalypts noting a more prolific growth of *Usnea* sp. and foliose types on the trees. The fruiting bodies on the lichens seemed to be better developed at this slightly higher elevation. A discussion was engendered by the observation that the lichens seemed to prefer some trees over others. We came to the opinion that the regular shedding of bark in some species did not allow the establishment of lichen colonies. There were numerous and varied lichens on the forest floor, the most spectacular being a large patch of *Cladia retipora.*

The return to the cars took us past a pine plantation with many lichens in evidence and on past an extensive "field" of pink and white *Epacris impressa* on the floor of a eucalypt coup. The track down to the cars allowed for recapitulation and a further species of *Cladia* was found.

The excursion then visited the Old Cemetery in Ballarat which is a rich source of lichens, particularly crustose forms. The lichens were growing on almost every substrate - bitumen and gravel paths, concrete and polished granite gravestones, wooden posts and cast iron railings. We did not linger too long here as the Ballarat chill was finding its way into our marrows!



Among the lichens seen today were:

Buellia sp.
Xanthoparmelia spp.
Cladia retipora
Cladia aggregata
Flavoparmelia sp.
Neofuscelia sp.
Punctelia subrudecta
Hypogymnia sp.
Usnea sp.
Ramalina sp.
Parmatrema chinense
Candelaria sp.

Literature on the field identification of lichens is almost non-existent. Dr. Ralston recommended:-

Eldridge and Tozer *A Practical Guide to Soil Lichens and Bryophytes in Australia's Dry Country.*
Dept. Land and Water Conservation NSW 1997.

Jarman and Fuhrer *Mosses and Liverworts in Tasmania and SE Australia.*
CSIRO 1995 (out of print) has only a brief mention of lichens.

Ken McDonnell.

A Glossary of Lichen Terminology

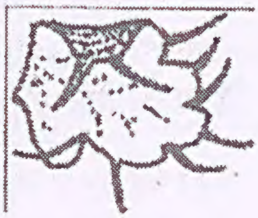
alga(e) - in lichens, single-celled or filamentous green organisms that contain chlorophyll.

apothecia - spore-producing fruiting bodies of the fungal partner.

asexual reproduction - reproduction without sex by producing vegetative propagules, isidia or soredia.

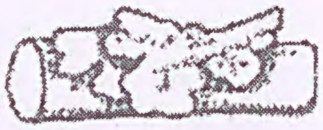
chlorophyll - is the organ in green plants that uses the sun's energy to turn carbon dioxide into carbohydrates.

cilia - whisker-like projections from the margin of a foliose lichen.



crustose lichens - crust-like lichens which grow directly on or under the bark surface and cannot be removed without cutting the bark.

foliose lichens - leaf-like lichens with spreading to upright flattened lobes which are attached to the twig from the lower surface of each lobe

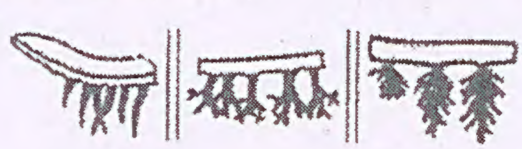


fruits - lichens reproduce sexually from spores produced in fruiting bodies (apothecia) by the fungal partner. Fruits may be rounded and jam-tart like with a distinct margin the same colour as the thallus, or like wine-gums with margins and centre the same colour, or elongated fruits in wavy to star shape, or fruits may be enclosed in pot, volcano, or wart-like bodies with a hole for spore release .

fruticose lichens - branched, shrub-like lichens which are attached to the twig by a single sucker-like holdfast.

isidia - darker (than thallus) finger- to knob-like propagules.

rhizines - root-like attachments from the lower surface of a foliose lichen. They may be simple (left), branched (centre) or bottle brush like (right).



soredia - paler (than thallus) powdery to granular propagules containing algal and fungal partners. Often occurring in specialised bodies called soralia (left), on the lobe margins or ends (centre), on the upper surface in cracks (right), or dots (below).

sorediate - with soredia.

spores - produced in fruiting bodies following sexual reproduction.

sterile - without fruiting bodies.

thallus - the lichen body.

From the Natural History Museum, London via internet.

Did you know...?

.....that lichens once provided important dyes for wool and other textiles, especially in Europe; Harris Tweed was originally dyed with colours from lichens, such as orchil (*Rocella spp*), purple; crottle (*Parmelia saxatilis*), orange-brown; black crottle (*P. omphalodes*), reddish brown; cudbear (*Ochrolechia tartarea*), purple; oak moss (*Evernia prunastri*), purplish-red to blue; orange lichen (*Xanthoria sp.*), yellow to crimson.

Most of the pigments are colourless while present in the lichen and only develop any colour in the extraction process which involves either boiling or fermentation. However as lichens are slow-growing and large quantities are needed to produce the dye, and it was difficult to get a constant colour between each dyeing session, synthetic dyes soon replaced them.

Lichen pigments are also used to make litmus, used to measure acidity. The main pigments come from orchil and cudbear which is red in acidic liquids but turns blue in more alkaline liquids. Other pigments are also added to give a transition of colours through green and yellow, giving a more accurate indication of pH.

From *The Encyclopaedia of Life Sciences.*

The new batch of **Embroidered Cloth Badges** has arrived!

Collect your badge from Bob.

Cost: $5

Review

Lichens by William Purvis. Reviewer: Carol Hall.
Natural History Museum, London 2000. $35. 112 pages. Limp cover.
Available from Andrew Isles Bookshop, Prahran.

No field guide is available for lichens in Australia but this book contains a wonderful overview of the nature of lichens with comprehensive diagrams in colour, and close-up and landscape photos taken in many parts of the world including Australia and New Zealand. It clearly illustrates the lichen groups seen on the excursion and explains ways of narrowing identification to genus level and even species in some cases. Chapters include the ecological role of lichens, lichens in forests, in extreme environments, as pollution monitors, their use in prospecting (minerals) and dating (on tombstones) and their economic uses. The text is written in a friendly manner and the book's format is most attractive, lending itself to browsing as well as study.

August Meeting Points

- 27 members and visitors were welcomed.
- Hats are available for those who have ordered them.
- Stella Bedggood Memorial Lecture: Members reminded that help is required with arranging room at 2 pm on Friday 6 September, trading table, supper and posters.
- Books donated by Lyndsay Fink are available for sale on trading table.
- VFNCA Campout: Greg Binns requests that members be asked to lend slides to be used in Friday night's program to set the local scene: landscapes, plant and animals are required. Members asked to pay registration fee and nominate excursions.
- Ballarat Environment Award draft nomination was circulated for comment.

Show and Tell.

- John Gregurke: Dead branch of Buloke showing the connection with mistletoe.

Field Reports

- John Gregurke: Masked Lapwing hatched 2 chicks with one infertile egg left in nest near corner of Grevillea Rd and Dowling St. Another Masked Lapwing is sitting on 4 eggs in North Gardens Reserve.
- Margaret Tonkin: Rainbow Lorikeets in Treasury Gardens, Melbourne.
- Bob Curtain: Many Sulphur-crested Cockatoos and Galahs in Ballarat East.
- Gail Whyte: Australian Shelduck ground feeding at Napoleons.

- John Mildren: At Mt. Helen Grey Currawongs are collecting nesting material and Wood Ducks are nesting in trees.
- Kay Preston: Red-browed Firetails feeding on back lawn in Sturt Street.
- Lyndsay Fink: In paddock near Geelong 5 heifers each with a Cattle Egret. Black-shouldered Kites and Australasian Kestrels are more common this year.
- Maureen Christie: Masked Lapwing nests in Gun Cotton area. White-faced Heron raiding garden pond for fish.

Mid-month Excursion—Clarkesdale Bird Sanctuary

Six members visited the BOCA/TFN/Happy Valley Water Reserve blocks on Tuesday August 20th; Pat and Bill Murphy wanted to compile a plant list. After a brief meeting with ranger David Coutts who showed us an aerial photo of the area delineating the various blocks, we surveyed an area closer to Linton known to Pat as the "orchid block". Evidence of *Thelymitra* species was found, while some Nodding Greenhoods *P. nutans* were in flower and *P. nana* were also in evidence. Other ground cover included Cranberry Heath and *Dianella* sp.; Golden Wattle *A. pycnantha* and Early Black Wattle *A. decurrens* were about to flower. Large swathes of a Coral Lichen covered extensive areas. A Yellow Robin appeared to see what we were up to and White-throated Treecreepers called.

In the BOCA block a Fantailed Cuckoo called, while at the swamp a Yellow-billed Spoonbill was disturbed and a Swamp Harrier took off and circled before settling again. Laughing Kookaburras were noticeably noisy. Several of the introduced banksias were in flower as were the grevilleas and hakeas. Manna Gums stood tall, smooth and straight, the ground at the bases of their trunks covered in the discarded bark of the previous season.

We drove south along Argyll Road to the Happy Valley Water Reserve block on the crest of the hill which we haven't looked at before. An apparently dry area dominated by Messmate Stringybarks, Narrow-leaved Peppermint and Scent-bark had very little ground cover: an occasional *A. aculeatissima, P. nutans,* Cranberry Heath, *Dianella* sp. and large quantities of *Usnea* sp. of lichen, lots of *Parmelia* sp. and some very fine grey crustose lichens (see how conscious we have become of lichens!!!). There was a lot of dead timber around and much evidence of wallaby/ kangaroo activity.

This is just a brief description, and Pat has a comprehensive list if you wish to study this area in more detail.

Editor.

Calendar

September	
Fri. 6	Stella Bedggood Memorial Lecture - *Platypus Research and Conservation* with Geoff Williams, Australian Platypus Conservancy. 8 pm.
Sun. 8	Excursion: *Paddy Ranges* with Lyle and Eileen Courtney.
Sun. 15	Berringa Land for Wildlife Open Day, 12 noon-4 pm. Old Berringa Reservoir. Info. from Elspeth Swan
Sat/Sun 21-22	Angair Wildflower Show, Memorial Hall, McMillan St. Anglesea.
Tues. 24	Mid-month Excursion: *Ballarat Common* re submission to Council.
Thurs. 26	Committee Meeting @ Kay Preston's 7.30 pm.
October	
Fri. 4	Meeting: *Sourcing the Seed* with Christine Eales.
Sun. 6	Excursion: *Ted Errey Nature Walk*, Brisbane Ranges.

Supper Duty

Oct: Volunteers needed. **Nov**: No meeting. **Dec**: Joan and Kenneth Riddell.

Committee

President .... Mrs. Carol Hall
Vice-President................ Mr. Greg Binns
Secretary......................... Mr. John Gregurke
Treasurer........................ Mr. Bob Curtain

Miss Helen Burgess..........
Miss Maureen Christie.......
Mrs. Claire Dalman..........
Mrs. Carol Hall (Editor).....
Mr. Les Hanrahan............
Mr. John Mildren.............
Mrs. Kay Preston..............

Correspondence: P.O. Box 328W, Ballarat West, 3350.

Email: Secretary:
Editor:

Website: www.ballarat.yourguide.com.au Click on *Local Info.* Search *Environment.*

Meetings are held at the Ballarat Horticultural Centre, cnr. Gregory & Gillies Sts (VicRoads 254 F8) on the first Friday of the month at 7.30pm.

Excursions: Depart from Creswick Plaza, Creswick Rd., Ballarat (VicRoads 255 M10) at 9.30 am unless otherwise specified.

A monthly publication of the Field Naturalists' Club of Ballarat Inc.
Incorporation # A0014919P